

What is claimed is

1. A method for communicating an information signal via one or more subchannels of a communications channel between a transmitting node and a receiving node of a data

5 communications network, the method comprising the steps of:

at the receiving node, determining for the or each subchannel, in dependence on the signal to noise ratio of the channel and a target transmission rate for the information signal, a gain factor to be applied to the subchannel signal at the transmitting node to effect transmission of the information signal to the receiving node with minimum transmission power;

10 communicating the gain factor for the or each subchannel signal from the receiving node to the transmitting node;

applying the gain factor to the corresponding subchannel signal at the transmitting node;

and,

transmitting the information signal to the receiving node.

15

2. A method as claimed in claim 1, wherein the determining step comprises the step of simulated annealing.

20

3. A method as claimed in claim 1, wherein the applying step comprises the step of multiplying the or each subchannel signal by the corresponding gain factor.

4. A method as claimed in claim 1, and further comprising the step of modulating the or each subchannel signal onto a corresponding carrier signal.

25

5. A method as claimed in claim 4, and wherein the applying step is performed prior to the modulating step.

6. A method for optimizing transmission power for communication of an information signal via one or more subchannels of a communications channel between a transmitting node and a

receiving node of a data communications network, the method comprising the receiving node performing the steps of:

determining for the or each subchannel, in dependence on the signal to noise ratio of the channel and a target transmission rate for the information signal, a gain factor to be applied to the subchannel signal at the transmitting node to effect transmission of the information signal to the receiving node with minimum transmission power; and,

communicating the gain factor for the or each subchannel signal from the receiving node to the transmitting node.

7. A method as claimed in claim 6, wherein the determining step comprises the step of simulated annealing.

8. A data communications network comprising:

a transmitting node;

a receiving node;

a communication link for communicating an information signal between the transmitting node and the receiving node, the communication channel having one or more subchannels;

the receiving node having a receive signal processor for determining for the or each subchannel, in dependence on the signal to noise ratio of the channel and a target transmission rate for the information signal, a gain factor to be applied to the subchannel signal at the transmitting node to effect transmission of the information signal to the receiving node with minimum transmission power, and for communicating the gain factor for the or each subchannel signal to the transmitting node; and,

the transmitting node having a transmit signal processor for applying the gain factor to the corresponding subchannel signal at the transmitting node, and transmitting the information signal to the receiving node.

9. A network as claimed in claim 8, wherein the receiver signal processor determines the gain by simulated annealing.

10. A network as claimed in claim 8, wherein the transmit signal processor comprises a multiplier for multiplying the or each subchannel signal by the corresponding gain factor.

11. A network as claimed in claim 8, wherein the transmit signal processor comprises a  
5 modulator for modulating the or each subchannel signal onto a corresponding carrier signal.

12. A network as claimed in claim 11, wherein the transmit signal processor applies the gain factor to the corresponding subchannel signal upstream of the modulator.

10 13. A network as claimed in claim 8, wherein the communications channel comprises a plurality of subchannels.

14. A receiving node for a data communications network comprising a communication  
channel for communicating an information signal between a transmitting node and the receiving  
15 node, the communication channel having one or subchannels, the receiving node having a receive  
signal processor for determining for the or each subchannel, in dependence on the signal to noise  
ratio of the channel and a target transmission rate for the information signal, a gain factor to be  
applied to the subchannel signal at the transmitting node to effect transmission of the information  
signal to the receiving node with minimum transmission power, and for communicating the gain  
20 factor for the or each subchannel signal to the transmitting node.

15. A method for compensating for cross talk in a multichannel communications link  
comprising a plurality of channels each having at least one sub channel, between a transmitting  
node and a receiving node of a data communications network, the method comprising, in a  
25 receiving node, for the or each subchannel of each channel, the steps of:

partitioning the subchannels of the other channels into high crosstalk subchannels and  
low crosstalk subchannels; and,

decoding the subchannel signal in dependence on the or each high crosstalk subchannel  
signal.

16. A method as claimed in claim 15, wherein the subchannels are partitioned into high crosstalk subchannels and low crosstalk subchannels in dependence on a threshold crosstalk level.

17. A receiver for compensating for cross talk in a multichannel communications link comprising a plurality of channels each having at least one sub channel, the receiver comprising a signal processor to, for the or each subchannel of each channel, partition the subchannels of the other channels into high crosstalk subchannels and low crosstalk subchannels, and decode the subchannel signal in dependence on the or each high crosstalk subchannel signal.

18. A receiver as claimed in claim 17, wherein the subchannels are partitioned into high crosstalk subchannels and low crosstalk subchannels in dependence on a threshold crosstalk level.

19. A method for communicating information signals via respective channels, each having at least one subchannel, of a multichannel communications link between a transmitting node and a receiving node of a data communications network, the method comprising the steps of:

at the receiving node, determining for each subchannel of each channel, in dependence on the signal to noise ratio of the channel and a target transmission rate for the information signal over that channel, a gain factor to be applied at the subchannel signal at the transmitting node to effect transmission of the information signal to the receiving node with minimum transmission power;

communicating the gain factors for each subchannel signal from the receiving node to the transmitting node;

applying the gain factors to the corresponding subchannel signals at the transmitting node; and,

at the receiving node, for each subchannel of each channel, partitioning the subchannels of the other channels into high crosstalk subchannels and low crosstalk subchannels, and decoding the subchannel signal in dependence on the or each high crosstalk subchannel signal.

20. A method as claimed in claim 19, wherein the determining step comprises the step of simulated annealing.

21. A computer program product for optimizing transmission power for communication of an information signal via one or more subchannels of a communications channel between a transmitting node and a receiving node of a data communications network, the computer program product comprising a machine readable storage medium storing computer program code which, when loaded in a programmable signal processor in the receiving node, configures the processor to perform the steps of:

determining for the or each subchannel, in dependence on the signal to noise ratio of the channel and a target transmission rate for the information signal, a gain factor to be applied to the subchannel signal at the transmitting node to effect transmission of the information signal to the receiving node with minimum transmission power; and,

communicating the gain factor for the or each subchannel signal from the receiving node to the transmitting node.

22. A computer program product for compensating for cross talk in a multichannel communications link comprising a plurality of channels each having at least one sub channel, between a transmitting node and a receiving node of a data communications network, the computer program product comprising a machine readable storage medium storing computer program code which, when loaded in a programmable signal processor in the receiving node, configures the processor to perform, for the or each subchannel of each channel, the steps of:

partitioning the subchannels of the other channels into high crosstalk subchannels and low crosstalk subchannels; and,

decoding the subchannel signal in dependence on the or each high crosstalk subchannel signal.